Spawning Aggregations of Reef Fishes

SCRFA

SOCIETY FOR THE CONSERVATION OF REEF FISH AGGREGATIONS

What are spawning aggregations?

They are important for fish and fishers

© Rachel T. Graham

An aggregation of dog snapper (see also on front cover) off Belize in central America, releasing massive visible (white) clouds of egg and sperm in a large transient spawning aggregation. It is likely that this is the only annual reproductive opportunity for this species. Many aggregating snappers in the western Pacific probably spawn like this.

Spawning or mating aggregations are a vital part of the life cycle of many commercially important fishes. Over 110 reef species, in more than 20 families, reproduce in aggregations, each one ranging from just a few, to tens of thousands of fish. The resulting juveniles replenish reef fish populations, sustain fisheries, and support livelihoods in coastal communities of the tropics.

Fish species vary widely in the timing, location, and frequency of spawning, as well as in the distance they migrate to reach spawning sites.

- 'Resident' aggregations form frequently, close to 'home', and in many places.
- 'Transient' aggregations form tens or hundreds of kilometers from resident reefs, for short periods each year. This type of aggregation is less common and occurs in relatively fewer places.

Whether transient or resident, the aggregations are temporary and only form for reproduction. Indeed, for some fishes, aggregations are the only known spawning or mating opportunity.

Why are we concerned about aggregations?

Aggregations are predictable and easy to overfish

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For many species, potential aggregation sites are easy to spot. Examples from the western Pacific involve the use of reef channels where fish congregate predictably for short periods each year to release eggs and sperm. Charts and aerial surveys readily identify these sites.

For individual species in a given area, these important reproductive events predictably form at the same places and times each year. Because they can yield large catches, and are often easy to relocate once discovered, aggregations are attractive to fishers. Overexploitation can quickly occur, compromising reproduction, reducing fisheries and decimating fish populations; in extreme cases a species could be biologically threatened.

Some fishes only aggregate in specific types of habitats. In the Indo-Pacific, several different grouper species gather in outer reef channels and passes. In the Caribbean, reef promontories may be favoured. While many species are not so predictable in their spawning habitat, those that are will be especially easy to find, and important to protect.

A clear and simple message

Uncontrolled fishing on aggregations can result in their depletion and possible disappearance, sometimes within just a few years of discovery.

Declines are occurring worldwide

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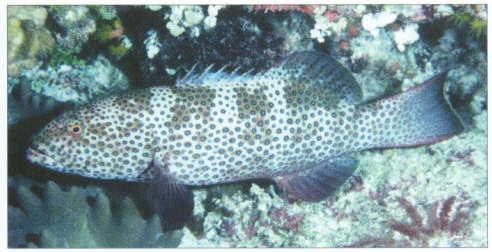
Brown-marbled grouper



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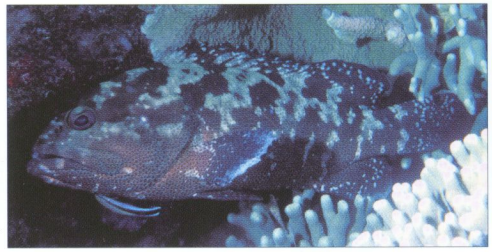
Squaretail coral grouper



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Camouflage grouper

Yvonne Sadovy

Live fish on sale in Hong Kong.

Three groupers that often spawn in the same places and at approximately the same times each year are the camouflage grouper (*Epinephelus polyphekadion*), the brown-marbled grouper (*E. fuscoguttatus*), and the squaretail coralgrouper (*Plectropomus areolatus*). These species are quite valuable, their aggregations are easy to find year after year and they can be readily overfished.

In the Indo-Pacific, many spawning aggregations are declining, very probably the result of aggregation -fishing. Declines and even losses are known for groupers, emperors, mullets, and rabbitfishes in the Philippines, Indonesia, Fiji, and the Solomon Islands. These problems have become worse following growth in the export trade of aggregating species, and particularly when traders actively look for groupers for the Hong Kong-based live reef food fish trade.

Right photos: fisher cleaning mullet taken during a migration to their spawning site. While small catches for subsistence use can be sustained, large commerical catches of migrating fish can soon lead to declining fish numbers and reduced local food supply.

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How are spawning aggregations best protected?

The challenge of protection

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Protection of large aggregations of dog snapper, like this one on Belize barrier reef in the Caribbean Sea, is a challenge but can be achieved by spatial or temporal based measures.

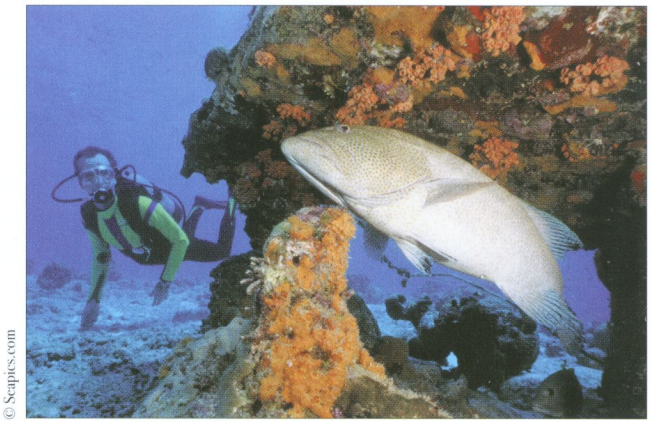
There are several ways to conserve and manage these important reproductive events. Much, of course, depends on the local cultural context, management capacity, and the biology of the species but there are many options available.

Examples include:

- Closing the spawning site to fishing during the reproductive season;
- Protecting aggregation sites by incorporating them into no-take marine protected areas;
- Banning the sale of aggregating species during the reproductive period (this could also be applied to protect pre-spawning migration periods when fish are particularly vulnerable to capture).

Management alone is not enough

The need for information



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Underwater surveys of aggregating fish provide an important source of information on aggregation status independent of any fishery. Fishery-dependent data is also useful but can be misleading if not carefully collected and analysed.

Rick Hamilton

Rick Hamilton

Interviewing fishers in coastal communities in Papua New Guinea.

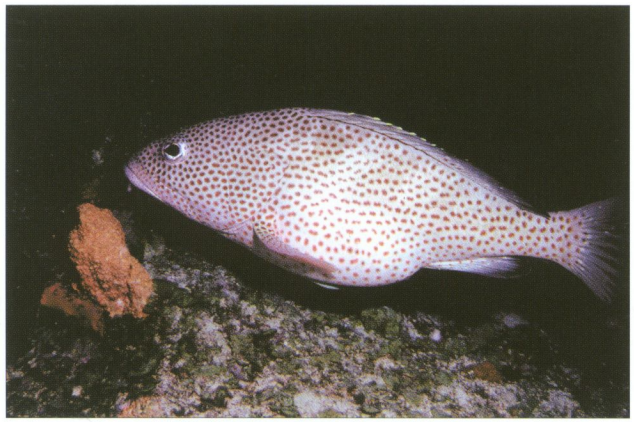
For effective protection, information is needed on:

- Timing and location of spawning aggregations in the area of interest;
- Distance traveled by fish to and from aggregation sites, as well as any migration routes;
- Baseline data on fish numbers and sizes to assess the impacts of fishing, or monitor the outcomes of management. This allows adaptive management.

Better understanding and awareness, among fisheries departments, marine protected area managers, fishing communities and by NGOs, are essential for appropriate studies to be conducted.

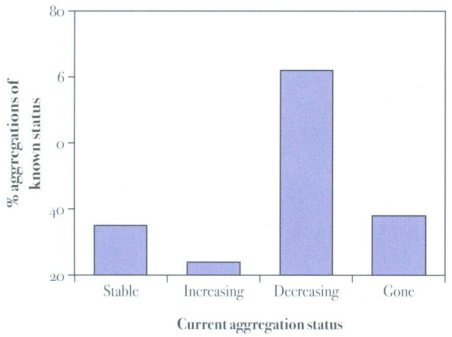
Is aggregation protection achievable?

There are success stories but not enough of them



Charles Arnoson

This female red hind is full of hydrated eggs and is about to spawn. Red hind aggregation sites in the Caribbean show encouraging signs of recovery after protection.



Of the 140 aggregation sites for which there is information on their current and past status, the great majority are in decline. Increases are typically associated with some form of protection.

The good news is that aggregations are beginning to receive the attention they need. Protective measures, for example, have recently been introduced in Belize and the Cayman Islands, Australia and Pohnpei; they are also in place in Palau and the USA , among others. The bad news is that the majority of aggregations are not protected at all, or that conservation measures are often inadequate. Particular problems highlighted are that:

- Incomplete information might result in protection at the wrong times or places;
- Aggregations may not be effectively incorporated into marine protected areas;
- Pre-spawning migration routes may remain vulnerable to fishing.

What is SCRFA?

And how can we help?

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The Society for the Conservation of Reef Fish Aggregations (SCRFA) was formed in 2000 with a mission to promote and facilitate the conservation and management of reef fish spawning aggregations. Its Board of Directors comprises experts from around the world.

The Society strives to raise awareness of the:

- Extreme vulnerability of fish spawning or mating aggregations;
- Immediate need for precautionary management;
- Appropriate methods to effectively study and manage aggregations.

The SCRFA supports and fosters sustainable management initiatives founded on good science. It also produces materials to raise awareness on the long-term ecological, economic and societal value of spawning aggregations, including website, newsletters, manuals, searchable aggregation database, and other relevant and topical information. We also conduct field studies and consultations.

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